

FIG. 1

Random Number Generator

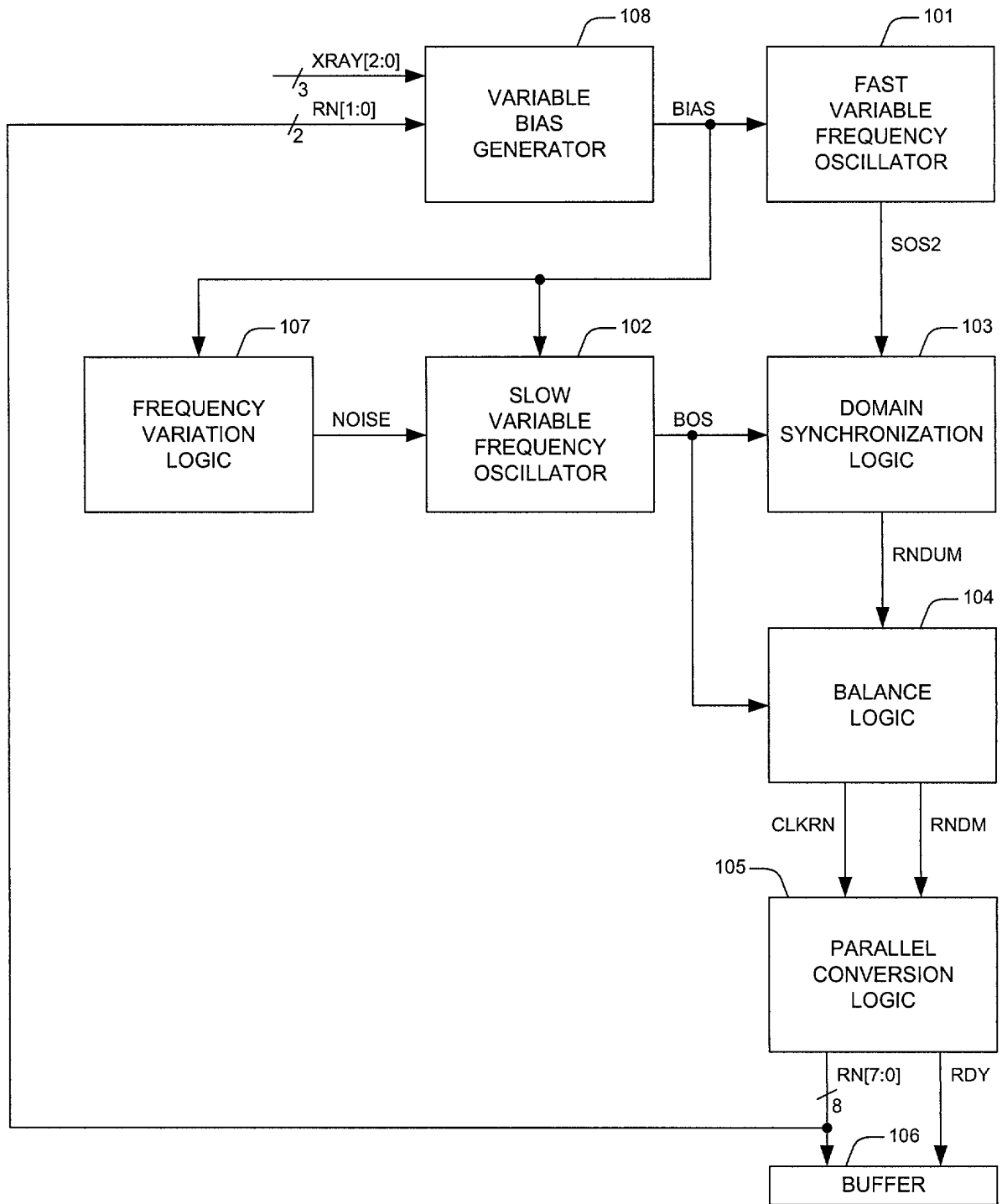


FIG. 2

Variable Bias Control of Oscillators

200

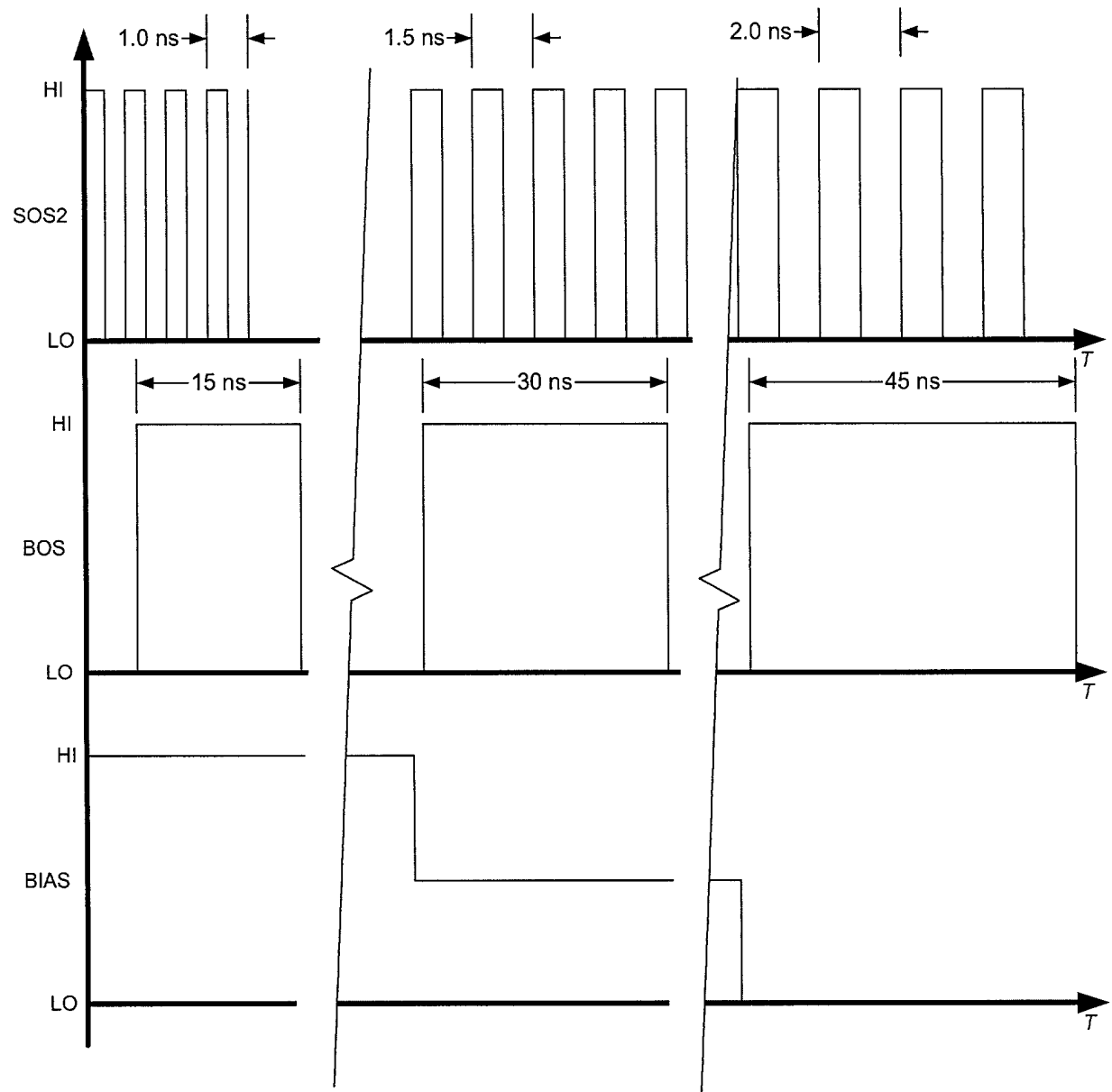


FIG. 3

Domain Synchronization Logic

300

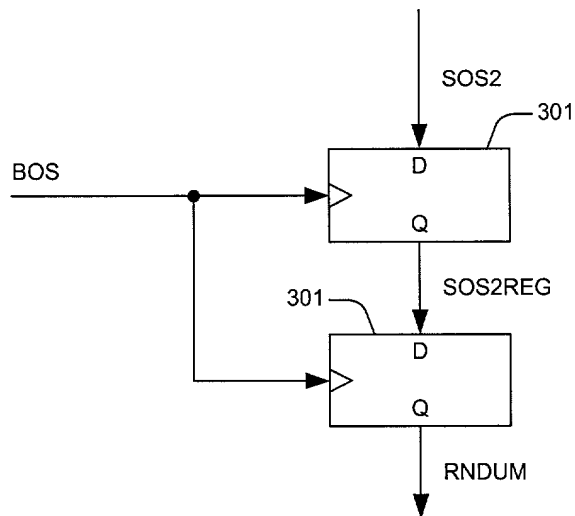


FIG. 4

Balance Logic

400

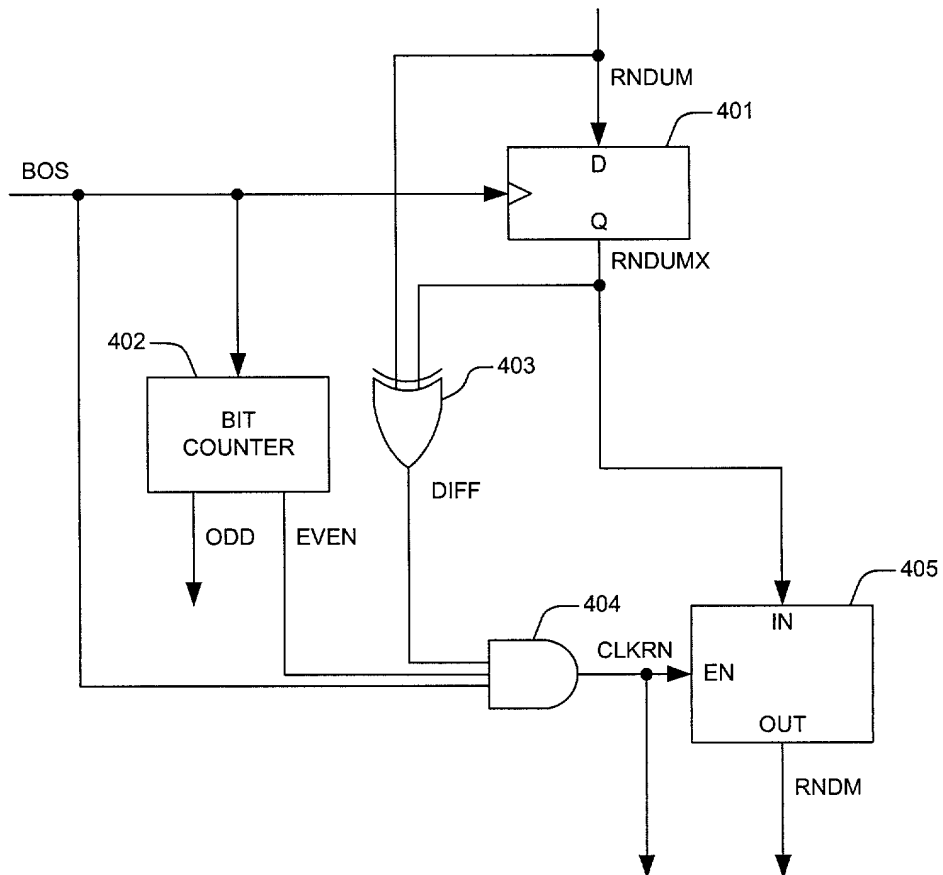


FIG. 5

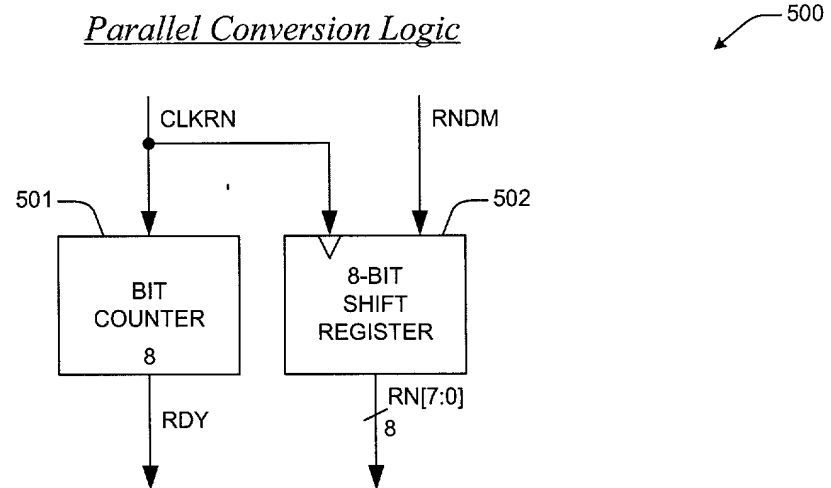


FIG. 6

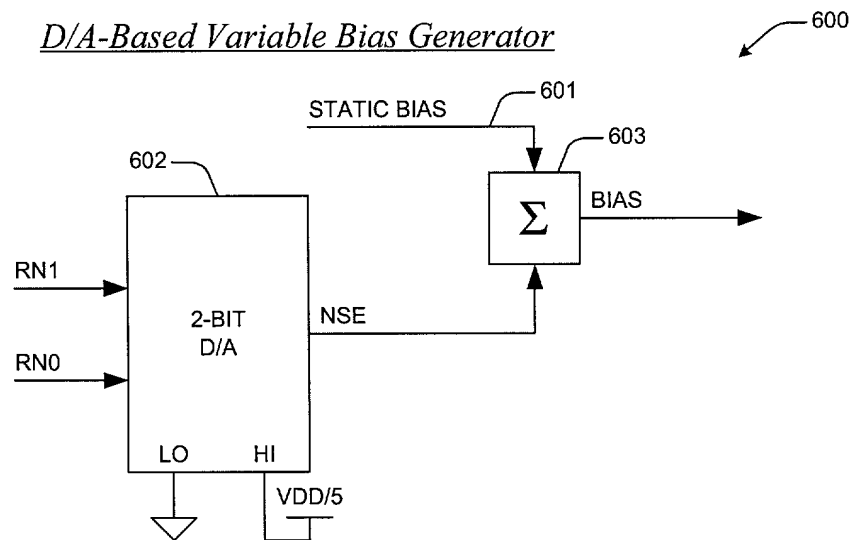


FIG. 7

Device-Based Variable Bias Generator

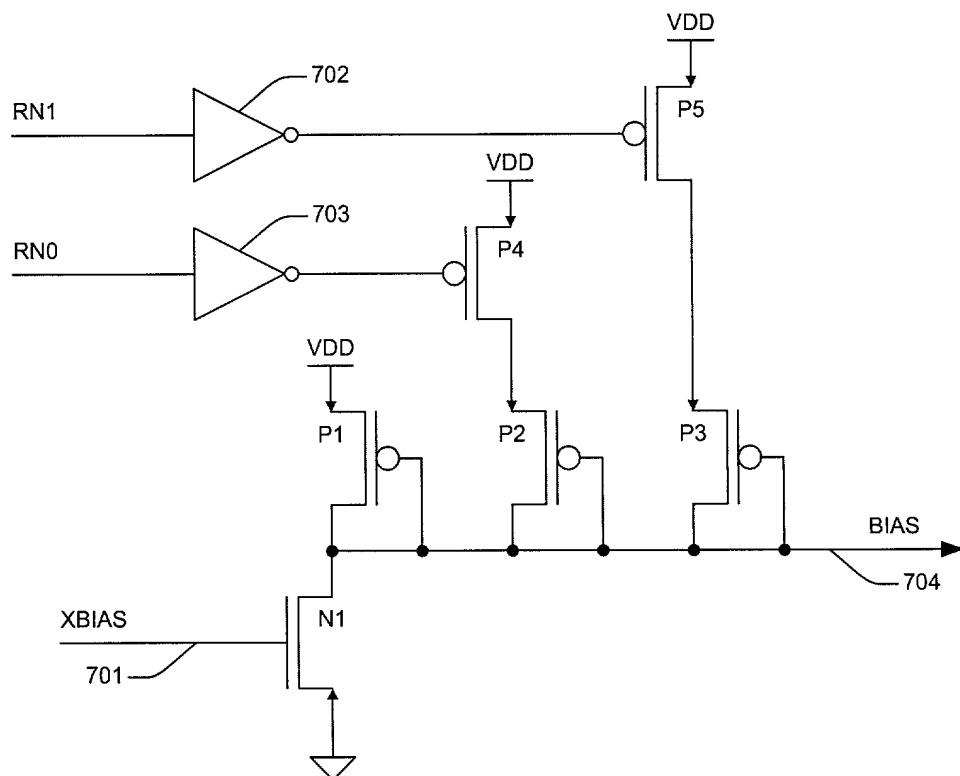


FIG. 8

Slow Frequency Variation Logic

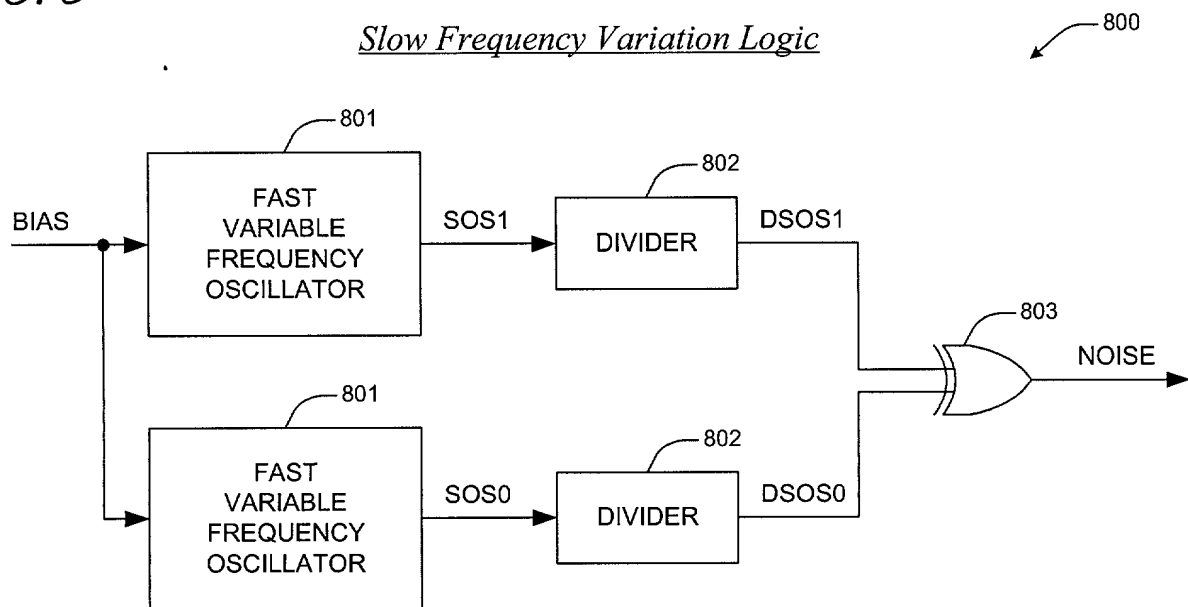


FIG. 9

Slow Variable Frequency Oscillator

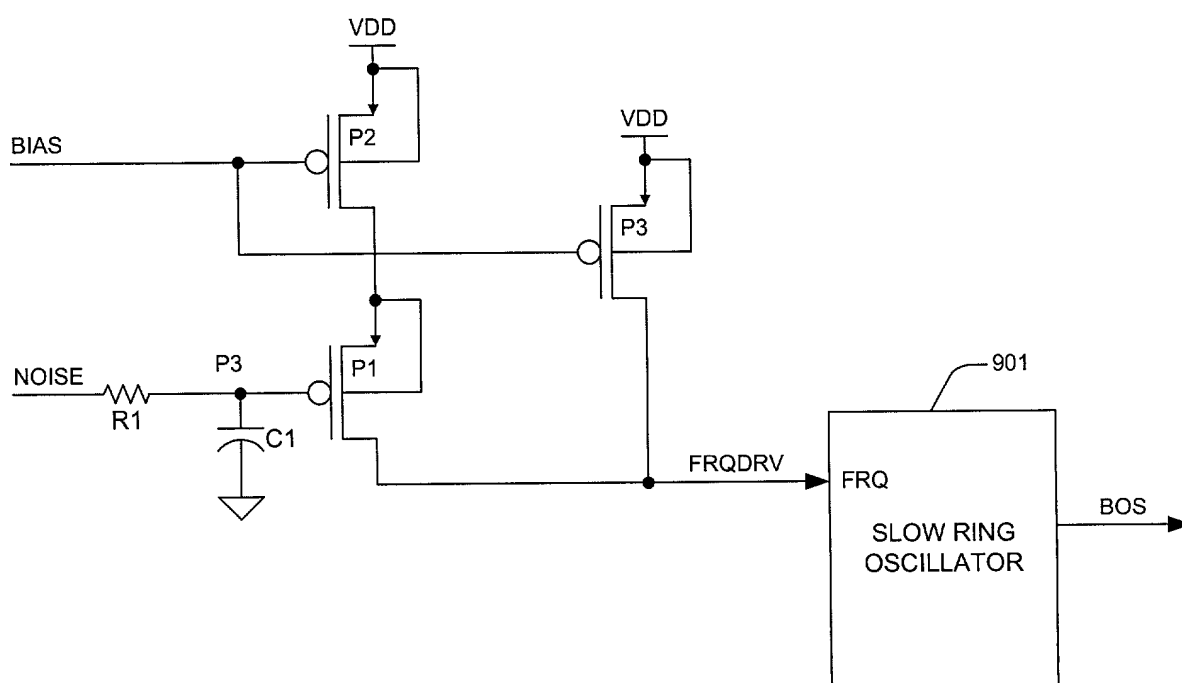


FIG. 10

Fast Oscillator Frequency

1000

XRAY[2:0]	BIAS (mv)	SOS_PERIOD (ns)	SOS_FREQUENCY
100	766	2.00	(MHz)
101	750	1.88	500
110	736	1.80	532
111	717	1.70	556
000	694	1.61	588
001	668	1.46	621
010	594	1.30	685
011	509	1.15	769

870

FIG. 11

Slow Oscillator Frequency

1100

XRAY[2:0]	BIAS (mv)	NOISE = 0		NOISE = 1	
		BOS PERIOD (ns)	BOS FREQUENCY (MHz)	BOS PERIOD (ns)	BOS FREQUENCY (MHz)
100	766	20.0	50	46.0	22
101	750	19.0	53	44.0	23
110	736	18.0	56	42.8	23
111	717	17.3	58	33.5	30
000	694	17.0	59	31.9	31
001	668	16.4	61	31.0	32
010	594	16.1	62	28.0	36
011	509	15.8	63	25.8	39